

<110> Dartois, Veronique A.
Hoch, James A.
Valle, Fernando
Kumar, Manoj

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tac Tyr	gcg Ala	gaa Glu	cgc Arg	cgt Arg	agc Ser	gta Val	cgg Arg	aag Lys	ctg Leu	att Ile	ttc Phe	atc Ile	tgt Cys	ctg Leu	atc Ile	354
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gaa Glu	cgt Arg	tca Ser	cgc Arg	gcc Ala	aac Asn	acc Thr	ttc Phe	tta Leu	atc Ile	ctc Leu	ggc Gly	aac Asn	ccg Pro	gtc Val	acg Thr	546
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Val Asn Met Gly Met Val Glu Val Gly Trp Leu Ser Ser Val Pro Tyr	
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ctg gcc gcg act att gcg atg atc gtc gtc tcc tgg gct tcc gat aaa	978
Leu Ala Ala Thr Ile Ala Met Ile Val Val Ser Trp Ala Ser Asp Lys	
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Met Gln Asn Arg Lys Leu Phe Val Trp Pro Leu Leu Leu Ile Gly Gly	
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Phe Gly Ser Trp Phe Val Gly Tyr Leu Asn Gly Thr Thr Gly Ser Pro	
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Ser Ala Ser Tyr Ile Phe Met Gly Val Ala Leu Phe Ala Ser Val Trp	
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Leu Thr Leu Ile Val Lys Pro Ala Asn Asn Gln Lys Leu Pro Ile Gly	
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Ala Arg His Ala	
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FOE080-10522660

<223> environmental source

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Gly	Ile	Ser	Ser	Leu	Leu	Gly	Ala	Leu	Phe	Phe	Leu	Gly	Tyr	Phe	Phe
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Phe	Gln	Ile	Pro	Gly	Ala	Ile	Tyr	Ala	Glu	Arg	Arg	Ser	Val	Arg	Lys
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Leu	Ile	Phe	Ile	Cys	Leu	Ile	Leu	Trp	Gly	Ala	Cys	Ala	Ser	Leu	Asp
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Arg	Asp	Gly	Ala	Gln	Tyr	Ser	Ser	Ala	Gly	Trp	Arg	Ser	Val	Leu	Phe
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Ser	Ala	Val	Val	Glu	Ala	Ala	Val	Met	Pro	Ala	Met	Leu	Ile	Tyr	Ile
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Tyr	Leu	Ile	Gln	Ser	Phe	Gly	Trp	Arg	Glu	Met	Phe	Ile	Ile	Glu	Gly
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Lys	Pro	Ser	Gln	Val	Asn	Trp	Leu	Ser	Glu	Asn	Glu	Lys	Ala	Ala	Leu
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Gln	Ala	Gln	Leu	Glu	Ser	Glu	Gln	Gln	Gly	Ile	Lys	Ala	Val	Arg	Asn
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Tyr	Gly	Glu	Ala	Phe	Arg	Ser	Arg	Asn	Val	Ile	Leu	Leu	Cys	Met	Gln
225					230					235					240
Tyr	Phe	Ala	Trp	Ser	Ile	Gly	Val	Tyr	Gly	Phe	Val	Leu	Trp	Leu	Pro
				245					250					255	
Ser	Ile	Ile	Arg	Ser	Gly	Gly	Val	Asn	Met	Gly	Met	Val	Glu	Val	Gly
			260					265					270		
Trp	Leu	Ser	Ser	Val	Pro	Tyr	Leu	Ala	Ala	Thr	Ile	Ala	Met	Ile	Val
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Pro	Leu	Leu	Leu	Ile	Gly	Gly	Leu	Ala	Phe	Ile	Gly	Ser	Trp	Ala	Val
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Gly	Ala	Asn	His	Phe	Trp	Ala	Ser	Tyr	Thr	Leu	Leu	Val	Ile	Ala	Asn
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Ala	Ala	Met	Tyr	Ala	Pro	Tyr	Gly	Pro	Phe	Phe	Ala	Ile	Ile	Pro	Glu
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Met	Leu	Pro	Arg	Asn	Val	Ala	Gly	Gly	Ala	Met	Ala	Leu	Ile	Asn	Ser
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Met	Gly	Ala	Leu	Gly	Ser	Phe	Phe	Gly	Ser	Trp	Phe	Val	Gly	Tyr	Leu
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Asn	Gly	Thr	Thr	Gly	Ser	Pro	Ser	Ala	Ser	Tyr	Ile	Phe	Met	Gly	Val
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0992501-080301

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<213> Unknown

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<221> CDS

<222> (214)...(1491)

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 aacaccgagt ttataaccct gaacgacacg gctgcgggcc tgtgtagacg cccctacgcc 180
 ttaacaccac taaatgactc tacaggtgta tat atg aat aca gcc tct gtt tct 234
 Met Asn Thr Ala Ser Val Ser
 1 5

gtc acc caa agc cag gcg atc ccc aaa tta cgc tgg ttg aga ata gtg 282
 Val Thr Gln Ser Gln Ala Ile Pro Lys Leu Arg Trp Leu Arg Ile Val
 10 15 20

cgc cct att ctt att acc tgc att att tcc tat atg gac cgg gtg aac 330
 Pro Pro Ile Leu Ile Thr Cys Ile Ile Ser Tyr Met Asp Arg Val Asn
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atc gcc ttc gcc atg ccc ggc ggc atg gac gat gaa ctg ggc atc acc 378
 Ile Ala Phe Ala Met Pro Gly Gly Met Asp Asp Glu Leu Gly Ile Thr
 40 45 50 55

gcc tcg atg gcc ggg ttg gcc ggc ggt att ttc ttt atc ggt tat ctg 426
 Ala Ser Met Ala Gly Leu Ala Gly Gly Ile Phe Phe Ile Gly Tyr Leu
 60 65 70

ttc ttg cag gta ccc ggc ggc aag ctg gcg gtg tac ggc aac ggc aag 474
 Phe Leu Gln Val Pro Gly Gly Lys Leu Ala Val Tyr Gly Asn Gly Lys
 75 80 85

aaa ttc atc ggt tgg tcg ttg ttg gcc tgg gcg gtg att tcc gtg ctg 522
 Lys Phe Ile Gly Trp Ser Leu Leu Ala Trp Ala Val Ile Ser Val Leu
 90 95 100

acc ggg ctg gtc acg aat cag tat caa ttg ctg ttc ctg cgc ttc gcc 570
 Thr Gly Leu Val Thr Asn Gln Tyr Gln Leu Leu Phe Leu Arg Phe Ala
 105 110 115

09922501.080301

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120 125 130 135	
agc aac tgg ttc ccg gac aag gaa cgc ggg cgc gcc aac gcc atc gtc	666
Ser Asn Trp Phe Pro Asp Lys Glu Arg Gly Arg Ala Asn Ala Ile Val	
140 145 150	
atc atg ttc gtg ccg atc gcc ggc atc ctt acc gca ccg ctg tcc ggc	714
Ile Met Phe Val Pro Ile Ala Gly Ile Leu Thr Ala Pro Leu Ser Gly	
155 160 165	
tgg atc atc acc gcc tgg gac tgg cgc atg ctg ttc ctg gtc gag ggc	762
Trp Ile Ile Thr Ala Trp Asp Trp Arg Met Leu Phe Leu Val Glu Gly	
170 175 180	
gcg ctg tcg ctg gtc gtg atg gtg ctg tgg tat ttc acc atc agc aac	810
Ala Leu Ser Leu Val Val Met Val Leu Trp Tyr Phe Thr Ile Ser Asn	
185 190 195	
cgt cca caa gag gcc aaa agg att tcg cag gcg gaa aaa gat tat ctg	858
Arg Pro Gln Glu Ala Lys Arg Ile Ser Gln Ala Glu Lys Asp Tyr Leu	
200 205 210 215	
atc aaa acg ctg cac gac gaa cag ttg ctg atc aaa ggc aaa acg gtg	906
Ile Lys Thr Leu His Asp Glu Gln Leu Leu Ile Lys Gly Lys Thr Val	
220 225 230	
cgc aac gcc tcg ctg cgt cgg gtg ctg ggc gac aaa atc atg tgg aag	954
Arg Asn Ala Ser Leu Arg Arg Val Leu Gly Asp Lys Ile Met Trp Lys	
235 240 245	
ttc ttc tac cag acc ggg ata tac ggc tac acc ctg tgg ctg ccg acc	1002
Phe Phe Tyr Gln Thr Gly Ile Tyr Gly Tyr Thr Leu Trp Leu Pro Thr	
250 255 260	
att ctc aag ggg ctc acc aac ggc aat atg gag cag gtc ggg atg ctg	1050
Ile Leu Lys Gly Leu Thr Asn Gly Asn Met Glu Gln Val Gly Met Leu	
265 270 275	
gct atc ctg ccc tat atc ggc gcc atc ttc ggc atg ctg atc att tcc	1098
Ala Ile Leu Pro Tyr Ile Gly Ala Ile Phe Gly Met Leu Ile Ile Ser	
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Thr Leu Ser Asp Arg Thr Gly Lys Arg Lys Val Phe Val Ala Leu Pro	
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Leu Ala Cys Phe Ala Ile Cys Met Ala Leu Ser Val Leu Leu Lys Asp	
315 320 325	
cac atc tgg tgg tcg tac gcg gcg ctg gtg ggc tgt ggc gtc ttt acc	1242

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His Ile Trp Trp Ser Tyr Ala Ala Leu Val Gly Cys Gly Val Phe Thr
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cag gcc gcc gcc ggg gtg ttc tgg acc att ccg gcc aag ctg ttt aac 1290
Gln Ala Ala Ala Gly Val Phe Trp Thr Ile Pro Pro Lys Leu Phe Asn
345 350 355

gcc gaa atg gcc ggc ggc ggc cgc ggc gtg atc aat gca ctg ggc aac 1338
Ala Glu Met Ala Gly Gly Ala Arg Gly Val Ile Asn Ala Leu Gly Asn
360 365 370 375

ctc ggc ggt ttc tgc ggc ccc tat atg gtc ggc gtg ttg atc acc ttg 1386
Leu Gly Gly Phe Cys Gly Pro Tyr Met Val Gly Val Leu Ile Thr Leu
380 385 390

ttc agc aaa gac gtc ggc gtt tac agc ctc ggc gtg tcg ctg gcc tcc 1434
Phe Ser Lys Asp Val Gly Val Tyr Ser Leu Ala Val Ser Leu Ala Ser
395 400 405

gcc tcg gtg ctg ggc ttg atg ctg ccg aac aga tgc gac caa aaa ggc 1482
Ala Ser Val Leu Ala Leu Met Leu Pro Asn Arg Cys Asp Gln Lys Ala
410 415 420

ggg gcc gaa taatggacta ttggctgggg ctggactgcg gcggcacctt 1531
Gly Ala Glu
425

tatcaaagcc ggctgtatg accggaatgg cgcagaactg ggcatagccc gccgtacgct 1591
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Ser Tyr Met Asp Arg Val Asn Ile Ala Phe Ala Met Pro Gly Gly Met
35 40 45
Asp Asp Glu Leu Gly Ile Thr Ala Ser Met Ala Gly Leu Ala Gly Gly
50 55 60
Ile Phe Phe Ile Gly Tyr Leu Phe Leu Gln Val Pro Gly Gly Lys Leu
65 70 75 80
Ala Val Tyr Gly Asn Gly Lys Lys Phe Ile Gly Trp Ser Leu Leu Ala

09922501.030301

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Leu	Thr	Ala	Pro	Leu	Ser	Gly	Trp	Ile	Ile	Thr	Ala	Trp	Asp	Trp	Arg
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Met	Leu	Phe	Leu	Val	Glu	Gly	Ala	Leu	Ser	Leu	Val	Val	Met	Val	Leu
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Trp	Tyr	Phe	Thr	Ile	Ser	Asn	Arg	Pro	Gln	Glu	Ala	Lys	Arg	Ile	Ser
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385				390					395						400
Leu	Ala	Val	Ser	Leu	Ala	Ser	Ala	Ser	Val	Leu	Ala	Leu	Met	Leu	Pro
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1

5

10

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15 20 25

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Ala Asn Phe Ser Phe Ala Ser Ala Ala Gly Ile Thr Glu Asp Leu Gly
30 35 40 45

atc acc aaa ggt atc tcc tcc ctt ctg ggg gcg ctg ttc ttc ctc ggc 255
Ile Thr Lys Gly Ile Ser Ser Leu Leu Gly Ala Leu Phe Phe Leu Gly
50 55 60

tac ttc ttc ttt cag atc ccc ggc gcg att tat gcc gaa cgc cgc agc 303
Tyr Phe Phe Phe Gln Ile Pro Gly Ala Ile Tyr Ala Glu Arg Arg Ser
65 70 75

gta cgt aaa ctc att ttc atc tgc ctg atc ctg tgg ggt gcc tgc gcc 351
Val Arg Lys Leu Ile Phe Ile Cys Leu Ile Leu Trp Gly Ala Cys Ala
80 85 90

tca ctc gac cgg gat ggt gca caa tat tcc cgc gct ggg cgg gcg atc 399
Ser Leu Asp Arg Asp Gly Ala Gln Tyr Ser Arg Ala Gly Arg Ala Ile
95 100 105

cgc ttt atc ctt ggc gtg gtc gag gcc gca gtc atg ccg gcg atg ctg 447
Arg Phe Ile Leu Gly Val Val Glu Ala Ala Val Met Pro Ala Met Leu
110 115 120 125

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Ile Tyr Ile Ser Asn Trp Phe Thr Lys Ser Glu Arg Ser Arg Ala Asn
130 135 140

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Thr Phe Leu Ile Leu Gly Asn Pro Val Thr Val Leu Trp Met Ser Val
145 150 155

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Val Ser Gly Tyr Leu Ile Gln Ala Phe Gly Trp Arg Glu Met Phe Ile
160 165 170

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Ile Glu Gly Val Pro Ala Val Ile Trp Ala Phe Cys Trp Trp Val Leu
175 180 185

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Val Lys Asp Lys Pro Ser Gln Val Asn Trp Leu Ala Glu Ser Glu Lys

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gtg cgc aac tac ggt gag gcc ttc cgc tcg cgt aac gtg gtc ctg ctg																		783
Val Arg Asn Tyr Gly Glu Ala Phe Arg Ser Arg Asn Val Val Leu Leu																		
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tgc atg caa tat ttc gcc tgg agc atc ggg gtt tac ggt ttc gtg ctg																		831
Cys Met Gln Tyr Phe Ala Trp Ser Ile Gly Val Tyr Gly Phe Val Leu																		
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Trp Leu Pro Ser Ile Ile Arg Ser Gly Gly Glu Asn Met Gly Met Val																		
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gag gtc ggc tgg ctc tca tcc gtc ccc tac ctg gcg gca acc atc gcc																		927
Glu Val Gly Trp Leu Ser Ser Val Pro Tyr Leu Ala Ala Thr Ile Ala																		
270	275							280							285			
atg atc gtg gtc tcc tgg gcc tcc gat aaa atg cag aac cgc aag cta																		975
Met Ile Val Val Ser Trp Ala Ser Asp Lys Met Gln Asn Arg Lys Leu																		
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Ile Ala Gly Ala Ala Met Tyr Ala Pro Tyr Gly Pro Phe Phe Ala Ile																		
	335							340							345			
att ccc gag atg ctg ccg cgt aac gtc gcc ggg ggc gcc atg gcg ctg																		1167
Ile Pro Glu Met Leu Pro Arg Asn Val Ala Gly Gly Ala Met Ala Leu																		
350	355							360							365			
att aac agc atg ggc gcg ctg ggt tca ttc ttt ggc tca tgg ttt gtc																		1215
Ile Asn Ser Met Gly Ala Leu Gly Ser Phe Phe Gly Ser Trp Phe Val																		
	370							375							380			
ggc tac ctg aac ggc acc acc ggc agc ccg tca gcc tcg tac att ttt																		1263
Gly Tyr Leu Asn Gly Thr Thr Gly Ser Pro Ser Ala Ser Tyr Ile Phe																		
	385							390							395			
atg gga gtg gcg ctt ttc gtc tcg gta tgg ctt act ttg att gtt aag																		1311
Met Gly Val Ala Leu Phe Val Ser Val Trp Leu Thr Leu Ile Val Lys																		
	400							405							410			

cct gct aat aat caa aaa ctt ccg ctc ggc gca cgt cac gcc 1353
Pro Ala Asn Asn Gln Lys Leu Pro Leu Gly Ala Arg His Ala
415 420 425

tgaacatta acgcaacgga gaaccgcatg aagccgtcag tcattctcta caaaacgctt 1413
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gcgtt 1478

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<212> PRT
<213> Klebsiella oxytoca

<400> 6
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Ile Val Phe Ile Thr Tyr Ser Leu Ala Tyr Leu Asp Arg Ala Asn Phe
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Ser Phe Ala Ser Ala Ala Gly Ile Thr Glu Asp Leu Gly Ile Thr Lys
35 40 45
Gly Ile Ser Ser Leu Leu Gly Ala Leu Phe Phe Leu Gly Tyr Phe Phe
50 55 60
Phe Gln Ile Pro Gly Ala Ile Tyr Ala Glu Arg Arg Ser Val Arg Lys
65 70 75 80
Leu Ile Phe Ile Cys Leu Ile Leu Trp Gly Ala Cys Ala Ser Leu Asp
85 90 95
Arg Asp Gly Ala Gln Tyr Ser Arg Ala Gly Arg Ala Ile Arg Phe Ile
100 105 110
Leu Gly Val Val Glu Ala Ala Val Met Pro Ala Met Leu Ile Tyr Ile
115 120 125
Ser Asn Trp Phe Thr Lys Ser Glu Arg Ser Arg Ala Asn Thr Phe Leu
130 135 140
Ile Leu Gly Asn Pro Val Thr Val Leu Trp Met Ser Val Val Ser Gly
145 150 155 160
Tyr Leu Ile Gln Ala Phe Gly Trp Arg Glu Met Phe Ile Ile Glu Gly
165 170 175
Val Pro Ala Val Ile Trp Ala Phe Cys Trp Trp Val Leu Val Lys Asp
180 185 190
Lys Pro Ser Gln Val Asn Trp Leu Ala Glu Ser Glu Lys Ala Ala Leu
195 200 205
Gln Glu Gln Leu Glu Arg Glu Gln Gln Gly Ile Lys Pro Val Arg Asn
210 215 220
Tyr Gly Glu Ala Phe Arg Ser Arg Asn Val Val Leu Leu Cys Met Gln
225 230 235 240
Tyr Phe Ala Trp Ser Ile Gly Val Tyr Gly Phe Val Leu Trp Leu Pro
245 250 255
Ser Ile Ile Arg Ser Gly Gly Glu Asn Met Gly Met Val Glu Val Gly
260 265 270
Trp Leu Ser Ser Val Pro Tyr Leu Ala Ala Thr Ile Ala Met Ile Val
275 280 285
Val Ser Trp Ala Ser Asp Lys Met Gln Asn Arg Lys Leu Phe Val Trp
290 295 300

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Pro Leu Leu Leu Ile Ala Ala Phe Ala Phe Ile Gly Ser Trp Ala Val
 305 310 315 320
 Gly Ala Asn His Phe Trp Val Ser Tyr Thr Leu Leu Val Ile Ala Gly
 325 330 335
 Ala Ala Met Tyr Ala Pro Tyr Gly Pro Phe Phe Ala Ile Ile Pro Glu
 340 345 350
 Met Leu Pro Arg Asn Val Ala Gly Gly Ala Met Ala Leu Ile Asn Ser
 355 360 365
 Met Gly Ala Leu Gly Ser Phe Phe Gly Ser Trp Phe Val Gly Tyr Leu
 370 375 380
 Asn Gly Thr Thr Gly Ser Pro Ser Ala Ser Tyr Ile Phe Met Gly Val
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 Asn Gln Lys Leu Pro Leu Gly Ala Arg His Ala
 420 425

<210> 7
 <211> 1600
 <212> DNA
 <213> Pantoea citrea

<220>
 <221> CDS
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 tttatagctc ctgataagca cagttcgcag cgcgtaactg caccgcaggt gttctgcttt 180
 gcgtaactg acaaaacaga aaggggatat atc atg caa aaa tca cag ccg gga 234
 Met Gln Lys Ser Gln Pro Gly
 1 5

acc cgc tgg ttt cgg att att gtg ccg atc ctg ata gcc tgc atc atg 282
 Thr Arg Trp Phe Arg Ile Ile Val Pro Ile Leu Ile Ala Cys Ile Met
 10 15 20

tcg ttt atg gat cgg gta aat atc agt ttc gca ttg ccg ggc ggt atg 330
 Ser Phe Met Asp Arg Val Asn Ile Ser Phe Ala Leu Pro Gly Gly Met
 25 30 35

gag cag gat ctg ctg atg tcc agc cag atg gcc ggg gta gtt agc ggt 378
 Glu Gln Asp Leu Leu Met Ser Ser Gln Met Ala Gly Val Val Ser Gly
 40 45 50 55

att ttc ttt att ggt tat ctg ttt ttg cag gtt cct ggt ggg cat atc 426
 Ile Phe Phe Ile Gly Tyr Leu Phe Leu Gln Val Pro Gly Gly His Ile
 60 65 70

gca gta cgt ggc agt ggt aaa cgt ttt att gcc tgg tcg ctt gtt gcc 474
 Ala Val Arg Gly Ser Gly Lys Arg Phe Ile Ala Trp Ser Leu Val Ala

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75								80				85						
tgg	gcc	gtt	gtt	tct	gtc	gct	acc	ggg	ttt	gtg	act	cat	cag	tac	cag	522		
Trp	Ala	Val	Val	Ser	Val	Ala	Thr	Gly	Phe	Val	Thr	His	Gln	Tyr	Gln			
90				95				100										
ctg	ttg	att	tta	cgt	ttt	gca	ctg	ggg	gtc	tct	gaa	ggg	ggg	atg	ttg	570		
Leu	Leu	Ile	Leu	Arg	Phe	Ala	Leu	Gly	Val	Ser	Glu	Gly	Gly	Met	Leu			
105				110				115										
ccg	gta	gtt	ctg	aca	atg	gtc	agc	aac	tgg	ttt	cct	gaa	aaa	gag	ctg	618		
Pro	Val	Val	Leu	Thr	Met	Val	Ser	Asn	Trp	Phe	Pro	Glu	Lys	Glu	Leu			
120				125				130				135						
ggg	cgt	gct	aat	gca	ttt	gtc	atg	atg	ttc	gcc	ccg	ctt	ggc	gga	atg	666		
Gly	Arg	Ala	Asn	Ala	Phe	Val	Met	Met	Phe	Ala	Pro	Leu	Gly	Gly	Met			
140				145				150										
att	acc	gcc	cct	gtc	tcc	gga	tgg	att	att	gca	ctg	cta	gac	tgg	cgc	714		
Ile	Thr	Ala	Pro	Val	Ser	Gly	Trp	Ile	Ile	Ala	Leu	Leu	Asp	Trp	Arg			
155				160				165										
tgg	tta	ttt	att	atc	gaa	gga	tta	ctg	tcg	gta	gtg	gtt	ctg	gca	gtc	762		
Trp	Leu	Phe	Ile	Ile	Glu	Gly	Leu	Leu	Ser	Val	Val	Val	Leu	Ala	Val			
170				175				180										
tgg	tgg	ctg	atg	gtc	agt	gac	cgc	cct	gaa	gat	gcc	cgt	tgg	ctg	ccg	810		
Trp	Trp	Leu	Met	Val	Ser	Asp	Arg	Pro	Glu	Asp	Ala	Arg	Trp	Leu	Pro			
185				190				195										
gca	gca	gaa	cgg	gaa	tat	ctg	ctg	cgc	gaa	atg	gcc	cgt	gac	aag	gcc	858		
Ala	Ala	Glu	Arg	Glu	Tyr	Leu	Leu	Arg	Glu	Met	Ala	Arg	Asp	Lys	Ala			
200				205				210				215						
gag	cgg	agc	aaa	ctc	cct	ccg	atc	agt	cat	gct	ccc	ctg	caa	gag	gtt	906		
Glu	Arg	Ser	Lys	Leu	Pro	Pro	Ile	Ser	His	Ala	Pro	Leu	Gln	Glu	Val			
220				225				230										
ttc	cat	aac	ccg	ggc	ctg	atg	aag	tta	gtg	att	ctg	aac	ttt	ttc	tat	954		
Phe	His	Asn	Pro	Gly	Leu	Met	Lys	Leu	Val	Ile	Leu	Asn	Phe	Phe	Tyr			
235				240				245										
cag	aca	ggg	gat	tac	gga	tac	act	ctg	tgg	ctg	ccg	act	att	atc	aaa	1002		
Gln	Thr	Gly	Asp	Tyr	Gly	Tyr	Thr	Leu	Trp	Leu	Pro	Thr	Ile	Ile	Lys			
250				255				260										
aac	ctg	acc	gga	gct	agt	att	ggg	aac	gtc	ggg	ttg	ctg	aca	gtg	cta	1050		
Asn	Leu	Thr	Gly	Ala	Ser	Ile	Gly	Asn	Val	Gly	Leu	Leu	Thr	Val	Leu			
265				270				275										
cct	ttt	atc	gcg	acg	tta	tca	ggg	att	tat	gtc	gtc	tct	tac	ctg	agc	1098		
Pro	Phe	Ile	Ala	Thr	Leu	Ser	Gly	Ile	Tyr	Val	Val	Ser	Tyr	Leu	Ser			
280				285				290				295						

gat aaa acc ggc aaa cgt cgg caa tgg gtg atg att tct ctg ttc tgt	1146
Asp Lys Thr Gly Lys Arg Arg Gln Trp Val Met Ile Ser Leu Phe Cys	
300 305 310	
ttt gcg gcc tgc ctg ttg gcc tca gtc ctg tta cgt gaa ttt gtg ctg	1194
Phe Ala Ala Cys Leu Leu Ala Ser Val Leu Leu Arg Glu Phe Val Leu	
315 320 325	
gct gct tat ctg gct ctg gtg gct tgc ggc ttt ttc ctg aaa gca gcc	1242
Ala Ala Tyr Leu Ala Leu Val Ala Cys Gly Phe Phe Leu Lys Ala Ala	
330 335 340	
acc agc ccg ttc tgg agt att ccg gga cgt att gca ccg ccg gaa gca	1290
Thr Ser Pro Phe Trp Ser Ile Pro Gly Arg Ile Ala Pro Pro Glu Ala	
345 350 355	
gcc ggt agt gcc cgt ggt gta att aac gga ctg ggg aat ctg ggc ggt	1338
Ala Gly Ser Ala Arg Gly Val Ile Asn Gly Leu Gly Asn Leu Gly Gly	
360 365 370 375	
ttc tgc ggc ccc tgg ctg gtc gga tta atg atc tac ctg tac gga cag	1386
Phe Cys Gly Pro Trp Leu Val Gly Leu Met Ile Tyr Leu Tyr Gly Gln	
380 385 390	
aat gca gcc gtt gtt act ctg gca ggc tct ctg atc att gcc ggg att	1434
Asn Ala Ala Val Thr Leu Ala Gly Ser Leu Ile Ile Ala Gly Ile	
395 400 405	
att gcg gca tta ctg cca acg cag tgt gat ctg cgc ccg gca gag gca	1482
Ile Ala Ala Leu Leu Pro Thr Gln Cys Asp Leu Arg Pro Ala Glu Ala	
410 415 420	
cgg cag cag aat ttc acc cca cgt att cat gat gcc aaa taatactgtc	1531
Arg Gln Gln Asn Phe Thr Pro Arg Ile His Asp Ala Lys	
425 430 435	
accgcgtaac gctgttgccg ggtgcagcct tcacctttca gggcgtattt ttctgataac	1591
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<210> 8

<211> 436

<212> PRT

<213> Pantoea citrea

<400> 8

Met Gln Lys Ser Gln Pro Gly Thr Arg Trp Phe Arg Ile Ile Val Pro	
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Ile Leu Ile Ala Cys Ile Met Ser Phe Met Asp Arg Val Asn Ile Ser	
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Phe Ala Leu Pro Gly Gly Met Glu Gln Asp Leu Leu Met Ser Ser Gln	
35 40 45	
Met Ala Gly Val Val Ser Gly Ile Phe Phe Ile Gly Tyr Leu Phe Leu	

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50		55		60
Gln Val Pro Gly Gly His Ile Ala Val Arg Gly Ser Gly Lys Arg Phe				
65		70		75
Ile Ala Trp Ser Leu Val Ala Trp Ala Val Val Ser Val Ala Thr Gly				80
	85		90	
Phe Val Thr His Gln Tyr Gln Leu Leu Ile Leu Arg Phe Ala Leu Gly				95
	100		105	
Val Ser Glu Gly Gly Met Leu Pro Val Val Leu Thr Met Val Ser Asn				110
	115		120	
Trp Phe Pro Glu Lys Glu Leu Gly Arg Ala Asn Ala Phe Val Met Met				125
	130		135	
Phe Ala Pro Leu Gly Gly Met Ile Thr Ala Pro Val Ser Gly Trp Ile				140
	145		150	
Ile Ala Leu Leu Asp Trp Arg Trp Leu Phe Ile Ile Glu Gly Leu Leu				155
	165		170	
Ser Val Val Val Leu Ala Val Trp Trp Leu Met Val Ser Asp Arg Pro				175
	180		185	
Glu Asp Ala Arg Trp Leu Pro Ala Ala Glu Arg Glu Tyr Leu Leu Arg				190
	195		200	
Glu Met Ala Arg Asp Lys Ala Glu Arg Ser Lys Leu Pro Pro Ile Ser				205
	210		215	
His Ala Pro Leu Gln Glu Val Phe His Asn Pro Gly Leu Met Lys Leu				220
	225		230	
Val Ile Leu Asn Phe Phe Tyr Gln Thr Gly Asp Tyr Gly Tyr Thr Leu				235
	245		250	
Trp Leu Pro Thr Ile Ile Lys Asn Leu Thr Gly Ala Ser Ile Gly Asn				255
	260		265	
Val Gly Leu Leu Thr Val Leu Pro Phe Ile Ala Thr Leu Ser Gly Ile				270
	275		280	
Tyr Val Val Ser Tyr Leu Ser Asp Lys Thr Gly Lys Arg Arg Gln Trp				285
	290		295	
Val Met Ile Ser Leu Phe Cys Phe Ala Ala Cys Leu Leu Ala Ser Val				300
	305		310	
Leu Leu Arg Glu Phe Val Leu Ala Ala Tyr Leu Ala Leu Val Ala Cys				315
	325		330	
Gly Phe Phe Leu Lys Ala Ala Thr Ser Pro Phe Trp Ser Ile Pro Gly				335
	340		345	
Arg Ile Ala Pro Pro Glu Ala Ala Gly Ser Ala Arg Gly Val Ile Asn				350
	355		360	
Gly Leu Gly Asn Leu Gly Gly Phe Cys Gly Pro Trp Leu Val Gly Leu				365
	370		375	
Met Ile Tyr Leu Tyr Gly Gln Asn Ala Ala Val Val Thr Leu Ala Gly				380
	385		390	
Ser Leu Ile Ile Ala Gly Ile Ile Ala Ala Leu Leu Pro Thr Gln Cys				395
	405		410	
Asp Leu Arg Pro Ala Glu Ala Arg Gln Gln Asn Phe Thr Pro Arg Ile				415
	420		425	
His Asp Ala Lys				430
	435			

<210> 9

<211> 1500

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gtg tta tgg atg tct att gtt tcc gga tat ctg atc aat gct ttt ggc 654
Val Leu Trp Met Ser Ile Val Ser Gly Tyr Leu Ile Asn Ala Phe Gly
155 160 165

tgg cgg gaa atg ttt att ttc gag ggt gtg cct gcc tta atc tgg gcc	702
Trp Arg Glu Met Phe Ile Phe Glu Gly Val Pro Ala Leu Ile Trp Ala	
170 175 180	
atc ttc tgg tgg ttt att gtc cgg gac aaa ccg gag cag gtg agc tgg	750
Ile Phe Trp Trp Phe Ile Val Arg Asp Lys Pro Glu Gln Val Ser Trp	
185 190 195	
ctg aca gaa aca gaa aag cag caa ctg gcc agt gca atg gct gaa gag	798
Leu Thr Glu Thr Glu Lys Gln Gln Leu Ala Ser Ala Met Ala Glu Glu	
200 205 210 215	
cag cag gca ata cca ccg atg cgc aat gtg ccg cag gcc ctg cgt tcc	846
Gln Gln Ala Ile Pro Pro Met Arg Asn Val Pro Gln Ala Leu Arg Ser	
220 225 230	
cgc aat gtg gtg gta ctg tgc ctg tta cac gct ctg tgg agc atc gga	894
Arg Asn Val Val Val Leu Cys Leu Leu His Ala Leu Trp Ser Ile Gly	
235 240 245	
gtg tat ggt ttt atg atg tgg atg cca tcg ata ctg cgt agc gct gca	942
Val Tyr Gly Phe Met Met Trp Met Pro Ser Ile Leu Arg Ser Ala Ala	
250 255 260	
tca atg gac att gtc cgg gta ggc tgg ctg gcc gca gtt ccg tat ctg	990
Ser Met Asp Ile Val Arg Val Gly Trp Leu Ala Ala Val Pro Tyr Leu	
265 270 275	
gcc gcg att att act atg ctg gtg att tca tgg ctg tca gat aaa acc	1038
Ala Ala Ile Ile Thr Met Leu Val Ile Ser Trp Leu Ser Asp Lys Thr	
280 285 290 295	
ggg ctg cgt cgg ctt ttt atc tgg cca tta ttg ctg att gcg tca gtt	1086
Gly Leu Arg Arg Leu Phe Ile Trp Pro Leu Leu Leu Ile Ala Ser Val	
300 305 310	
act ttt ttt ggg tcc tgg tta ctt ggg agc tac tca ttc tgg ttt tcc	1134
Thr Phe Phe Gly Ser Trp Leu Leu Gly Ser Tyr Ser Phe Trp Phe Ser	
315 320 325	
tat ggc ttg ctg gta ctg gct gct gct tgt atg tat gcc ccg tat gga	1182
Tyr Gly Leu Leu Val Leu Ala Ala Ala Cys Met Tyr Ala Pro Tyr Gly	
330 335 340	
ccg ttt ttt gcg ttg att cct gaa ttg ctg cca aaa aat gtg gcg ggg	1230
Pro Phe Phe Ala Leu Ile Pro Glu Leu Leu Pro Lys Asn Val Ala Gly	
345 350 355	
att tct atc ggg tta att aac tgt tgc ggg gcg ctg gga gct ttt gcc	1278
Ile Ser Ile Gly Leu Ile Asn Cys Cys Gly Ala Leu Gly Ala Phe Ala	
360 365 370 375	

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gga gcc tgg ctg gtg ggc tat ctt aat ggt ctg acc ggt ggt ccg ggg 1326
Gly Ala Trp Leu Val Gly Tyr Leu Asn Gly Leu Thr Gly Gly Pro Gly
380 385 390

gct tct tac act ttt atg gcc att gca ttg ctg gtt tct gta ggg ttg 1374
Ala Ser Tyr Thr Phe Met Ala Ile Ala Leu Leu Val Ser Val Gly Leu
395 400 405

gtg ttt ttc ctg aaa gtc cct tca ggg aat ttg gtc act cgt cgg ttg 1422
Val Phe Phe Leu Lys Val Pro Ser Gly Asn Leu Val Thr Arg Arg Leu
410 415 420

ctg aaa ggt gat gca aag taaaaggaat agcgatgaaa cggaacagga 1470
Leu Lys Gly Asp Ala Lys
425

tgtctttgca ggatattgcg gacctcgccg 1500

<210> 10
<211> 429
<212> PRT
<213> Pantoea citrea

<400> 10
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Pro Val Ile Phe Ile Thr Tyr Ser Leu Ala Tyr Leu Asp Arg Ala Asn
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Tyr Gly Phe Ala Ala Ala Ser Gly Ile Glu Ala Asp Leu Gly Ile Ser
35 40 45
Arg Gly Thr Ser Ser Leu Ile Gly Ala Leu Phe Phe Leu Gly Tyr Phe
50 55 60
Ile Phe Gln Val Pro Gly Ala Ile Tyr Ala Val Lys Arg Ser Val Arg
65 70 75 80
Lys Leu Val Phe Thr Ser Leu Leu Leu Trp Gly Phe Cys Ala Ala Ala
85 90 95
Thr Gly Leu Ile Ser Asn Ile Pro Ala Leu Met Val Ile Arg Phe Val
100 105 110
Leu Gly Val Val Glu Ala Ala Val Met Pro Ala Met Leu Ile Tyr Ile
115 120 125
Ser Asn Trp Phe Thr Arg Gln Glu Arg Ser Arg Ala Asn Thr Phe Leu
130 135 140
Val Leu Gly Asn Pro Val Thr Val Leu Trp Met Ser Ile Val Ser Gly
145 150 155 160
Tyr Leu Ile Asn Ala Phe Gly Trp Arg Glu Met Phe Ile Phe Glu Gly
165 170 175
Val Pro Ala Leu Ile Trp Ala Ile Phe Trp Trp Phe Ile Val Arg Asp
180 185 190
Lys Pro Glu Gln Val Ser Trp Leu Thr Glu Thr Glu Lys Gln Gln Leu
195 200 205
Ala Ser Ala Met Ala Glu Glu Gln Gln Ala Ile Pro Pro Met Arg Asn
210 215 220
Val Pro Gln Ala Leu Arg Ser Arg Asn Val Val Val Leu Cys Leu Leu

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225		230		235		240									
His	Ala	Leu	Trp	Ser	Ile	Gly	Val	Tyr	Gly	Phe	Met	Met	Trp	Met	Pro
		245		250		255									
Ser	Ile	Leu	Arg	Ser	Ala	Ala	Ser	Met	Asp	Ile	Val	Arg	Val	Gly	Trp
		260		265		270									
Leu	Ala	Ala	Val	Pro	Tyr	Leu	Ala	Ala	Ile	Ile	Thr	Met	Leu	Val	Ile
		275		280		285									
Ser	Trp	Leu	Ser	Asp	Lys	Thr	Gly	Leu	Arg	Arg	Leu	Phe	Ile	Trp	Pro
		290		295		300									
Leu	Leu	Leu	Ile	Ala	Ser	Val	Thr	Phe	Phe	Gly	Ser	Trp	Leu	Leu	Gly
305				310		315									320
Ser	Tyr	Ser	Phe	Trp	Phe	Ser	Tyr	Gly	Leu	Leu	Val	Leu	Ala	Ala	Ala
				325		330									335
Cys	Met	Tyr	Ala	Pro	Tyr	Gly	Pro	Phe	Ala	Leu	Ile	Pro	Glu	Leu	
				340		345									
Leu	Pro	Lys	Asn	Val	Ala	Gly	Ile	Ser	Ile	Gly	Leu	Ile	Asn	Cys	Cys
		355		360		365									
Gly	Ala	Leu	Gly	Ala	Phe	Ala	Gly	Ala	Trp	Leu	Val	Gly	Tyr	Leu	Asn
		370		375		380									
Gly	Leu	Thr	Gly	Gly	Pro	Gly	Ala	Ser	Tyr	Thr	Phe	Met	Ala	Ile	Ala
385				390		395									400
Leu	Leu	Val	Ser	Val	Gly	Leu	Val	Phe	Phe	Leu	Lys	Val	Pro	Ser	Gly
				405		410									415
Asn	Leu	Val	Thr	Arg	Arg	Leu	Leu	Lys	Gly	Asp	Ala	Lys			
		420		425											

<210> 11
 <211> 1500
 <212> DNA
 <213> Klebsiella oxytoca

<220>
 <221> CDS
 <222> (70)...(1386)

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 Met Asn Ile Thr Ser Asn Ser Thr Thr Lys Asp Ile Pro Arg
 1 5 10

cag cgc tgg tta aga atc att ccg cct ata ctg atc act tgt att att 159
 Gln Arg Trp Leu Arg Ile Ile Pro Pro Ile Leu Ile Thr Cys Ile Ile
 15 20 25 30

tct tat atg gac cgg gtc aat att gcc ttt gcg atg ccc gga ggt atg 207
 Ser Tyr Met Asp Arg Val Asn Ile Ala Phe Ala Met Pro Gly Gly Met
 35 40 45

gat gcc gac tta ggt att tcc gcc acc atg gcg ggg ctg gcg ggc ggt 255
 Asp Ala Asp Leu Gly Ile Ser Ala Thr Met Ala Gly Leu Ala Gly Gly
 50 55 60

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att	ttc	ttt	atc	ggt	tat	cta	ttt	tta	cag	gtt	ccc	ggc	ggg	aaa	att	303
Ile	Phe	Phe	Ile	Gly	Tyr	Leu	Phe	Leu	Gln	Val	Pro	Gly	Gly	Lys	Ile	
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gcc	gtt	cac	ggt	agc	ggt	aag	aaa	ttt	atc	ggc	tgg	tcg	ctg	gtc	gcc	351
Ala	Val	His	Gly	Ser	Gly	Lys	Lys	Phe	Ile	Gly	Trp	Ser	Leu	Val	Ala	
		80				85					90					
tgg	gcg	gtc	atc	tcc	gtg	ctg	acg	ggg	tta	att	acc	aat	cag	tac	cag	399
Trp	Ala	Val	Ile	Ser	Val	Leu	Thr	Gly	Leu	Ile	Thr	Asn	Gln	Tyr	Gln	
		95			100					105					110	
ctg	ctg	gcc	ctg	cgc	ttc	tta	ctg	ggc	gtg	gcg	gaa	ggc	ggt	atg	ctg	447
Leu	Leu	Ala	Leu	Arg	Phe	Leu	Leu	Gly	Val	Ala	Glu	Gly	Gly	Met	Leu	
				115					120					125		
ccg	gtc	gtt	ctc	acg	atg	atc	agt	aac	tgg	ttc	ccc	gac	gct	gaa	cgc	495
Pro	Val	Val	Leu	Thr	Met	Ile	Ser	Asn	Trp	Phe	Pro	Asp	Ala	Glu	Arg	
			130					135					140			
ggt	cgc	gcc	aac	gcg	att	gtc	att	atg	ttt	gtg	ccg	att	gcc	ggg	att	543
Gly	Arg	Ala	Asn	Ala	Ile	Val	Ile	Met	Phe	Val	Pro	Ile	Ala	Gly	Ile	
		145					150					155				
atc	acc	gcc	cca	ctc	tca	ggc	tgg	att	atc	acg	gtt	ctc	gac	tgg	cgc	591
Ile	Thr	Ala	Pro	Leu	Ser	Gly	Trp	Ile	Ile	Thr	Val	Leu	Asp	Trp	Arg	
		160				165					170					
tgg	ctg	ttt	att	atc	gaa	ggt	ttg	ctc	tcg	ctg	gtt	gtt	ctg	gtt	ctg	639
Trp	Leu	Phe	Ile	Ile	Glu	Gly	Leu	Leu	Ser	Leu	Val	Val	Leu	Val	Leu	
		175			180					185					190	
tgg	gca	tac	acc	atc	tat	gac	cgt	ccg	cag	gaa	gcg	cgc	tgg	att	tcc	687
Trp	Ala	Tyr	Thr	Ile	Tyr	Asp	Arg	Pro	Gln	Glu	Ala	Arg	Trp	Ile	Ser	
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gaa	gca	gag	aag	cgc	tat	ctg	gtc	gag	acg	ctg	gcc	gcg	gag	caa	aaa	735
Glu	Ala	Glu	Lys	Arg	Tyr	Leu	Val	Glu	Thr	Leu	Ala	Ala	Glu	Gln	Lys	
			210					215					220			
gcc	att	gcc	ggc	acc	gag	gtg	aaa	aac	gcc	tct	ctg	agc	gcc	gtt	ctc	783
Ala	Ile	Ala	Gly	Thr	Glu	Val	Lys	Asn	Ala	Ser	Leu	Ser	Ala	Val	Leu	
		225					230					235				
tcc	gac	aaa	acc	atg	tgg	cag	ctt	atc	gcc	ctg	aac	ttc	ttc	tac	cag	831
Ser	Asp	Lys	Thr	Met	Trp	Gln	Leu	Ile	Ala	Leu	Asn	Phe	Phe	Tyr	Gln	
		240				245					250					
acc	ggc	att	tac	ggc	tac	acc	ctg	tgg	cta	ccc	acc	att	ctg	aaa	gaa	879
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Cys	Met	Phe	Leu	Ser	Val	Ala	Leu	Lys	Asn	Gln	Ile	Trp	Leu	Ser	Tyr
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Val	Tyr	Cys	Leu	Ala	Ile	Ser	Leu	Ala	Leu	Ala	Ala	Leu	Met	Ala	Leu
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Leu	Leu	Pro	Ala	Lys	Cys	Asp	Ala	Gly	Ala	Ala	Pro	Val	Lys	Thr	Ile

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425

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atccaccccg ctctcccaa agctttatga ggctatagga tattgatatg gtatcgataa 180
cactcctgtc aagaggcggg ttccacgcca ggcgggaggg caaaatagga ctggacaatt 240
ccttcaagcg ggatatgtta tcgataacaa atcatcttcc ggaggagagc c atg agc 297
Met Ser
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aag atc gat gtg ttg cag gtc ggt ccc tac cct gca tgg gac gag gag 345
Lys Ile Asp Val Leu Gln Val Gly Pro Tyr Pro Ala Trp Asp Glu Glu
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cgc ctg aac gcg acc ttc acg atg cac cgc tat ttc gag gcg gcc gac 393
Arg Leu Asn Ala Thr Phe Thr Met His Arg Tyr Phe Glu Ala Ala Asp
20 25 30

aag gcg gcg ttt ctg gcc gag cac ggc ggc acg atc cgc ggc atc gcc 441
Lys Ala Ala Phe Leu Ala Glu His Gly Gly Thr Ile Arg Gly Ile Ala
35 40 45 50

acg cgc ggc gag ctt ggt gcc aac cgg gcg atg atc gag gcg ctg ccg 489
Thr Arg Gly Glu Leu Gly Ala Asn Arg Ala Met Ile Glu Ala Leu Pro
55 60 65

aag ctg gaa gtg atc tcg gtc tac ggc gtc ggc ttc gat gcg gtg gac 537
Lys Leu Glu Val Ile Ser Val Tyr Gly Val Gly Phe Asp Ala Val Asp
70 75 80

ctt tcg gcg gcc cgc gag cgc ggc atc cgc gtc acc aac acg ccc gac 585
Leu Ser Ala Ala Arg Glu Arg Gly Ile Arg Val Thr Asn Thr Pro Asp

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Gln	Ala	Arg	Gly	Val	Ile	Gly	Gly	Glu	Ala	Trp	Val	Lys	Ser	Gly	Asp	
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Trp	Ala	Ser	Lys	Gly	Leu	Tyr	Pro	Leu	Lys	Arg	Arg	Val	His	Gly	Met	
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Arg	Ala	Gly	Val	Leu	Gly	Leu	Gly	Arg	Ile	Gly	Tyr	Glu	Val	Ala	Lys	
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cgc	ctt	gcc	ggc	ttc	gac	atg	gac	atc	gcc	tac	agc	gac	acc	ggc	ccg	825
Arg	Leu	Ala	Gly	Phe	Asp	Met	Asp	Ile	Ala	Tyr	Ser	Asp	Thr	Gly	Pro	
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Lys	Asp	Phe	Ala	Arg	Asp	Trp	Thr	Phe	Val	Ala	Asp	Pro	Ala	Glu	Leu	
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gcc	gcc	cgc	tcc	gac	ttc	ctc	ttc	gtc	acg	ctc	gcc	gcc	tcc	gcc	gag	921
Ala	Ala	Arg	Ser	Asp	Phe	Leu	Phe	Val	Thr	Leu	Ala	Ala	Ser	Ala	Glu	
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Thr	Arg	His	Ile	Val	Gly	Arg	Lys	Val	Ile	Glu	Ala	Leu	Gly	Pro	Glu	
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ggc	atg	ctg	atc	aac	atc	tgc	cgc	gct	tcc	aac	atc	gat	gaa	agc	gcc	1017
Gly	Met	Leu	Ile	Asn	Ile	Ser	Arg	Ala	Ser	Asn	Ile	Asp	Glu	Ser	Ala	
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Leu	Leu	Asp	Ala	Leu	Glu	Thr	Lys	Ala	Leu	Gly	Ser	Ala	Ala	Leu	Asp	
245					250					255						
gtc	ttc	gag	ggc	gag	ccg	aac	ctc	aat	ccg	cgt	ttc	ctt	gcc	ctc	gac	1113
Val	Phe	Glu	Gly	Glu	Pro	Asn	Leu	Asn	Pro	Arg	Phe	Leu	Ala	Leu	Asp	
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aac	gtc	ctc	ttg	cag	ccg	cac	atg	gcc	tcc	ggc	acg	atc	gag	acc	cgc	1161
Asn	Val	Leu	Leu	Gln	Pro	His	Met	Ala	Ser	Gly	Thr	Ile	Glu	Thr	Arg	
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Lys	Ala	Met	Gly	Gln	Leu	Val	Phe	Asp	Asn	Leu	Ser	Ala	His	Phe	Asp	
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Gly Arg Pro Leu Pro Thr Pro Val Leu Met Lys Ala	
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Ile Val Ile His Gln Ala Lys Asp Leu Arg Val Glu Asp Ser Ala Val	
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Glu Ala Pro Gly Pro Gly Glu Val Glu Ile Arg Leu Ala Ala Gly Gly	
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Ile Cys Gly Ser Asp Leu His Tyr Tyr Asn His Gly Gly Phe Gly Thr	
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Val Ala Val Ser Pro Ser Arg Pro Cys Gly Ala Cys Asp Tyr Cys Leu	
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Lys Gly Leu Ala Asn His Cys Phe Asn Met Arg Phe Tyr Gly Ser Ala	
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Met Pro Phe Pro His Ile Gln Gly Ala Phe Arg Glu Arg Leu Val Ala	
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Lys Ala Ser Gln Cys Val Lys Ala Glu Gly Leu Ser Ala Gly Glu Ala	
450 455 460	
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Ala Met Ala Glu Pro Leu Ser Val Thr Leu His Ala Thr Arg Arg Ala	
465 470 475	
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Gly Glu Met Leu Gly Lys Arg Val Leu Val Thr Gly Cys Gly Pro Ile	
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Gly Thr Leu Ser Ile Leu Ala Ala Arg Arg Ala Gly Ala Ala Glu Ile	
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Gly Ala Asp Arg Thr Val Asn Leu Ser Glu Asp Arg Asp Gly Leu Val	
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Pro Phe Ser Glu Asn Lys Gly Tyr Phe Asp Val Leu Tyr Glu Cys Ser	
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Gly Ala Gln Pro Ala Leu Val Ala Gly Ile Gln Ala Leu Arg Pro Arg	
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Gly Val Ile Val Gln Leu Gly Leu Gly Gly Glu Met Ser Leu Pro Met	
575 580 585 590	
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Met Ala Ile Thr Ala Lys Glu Leu Asp Leu Arg Gly Ser Phe Arg Phe	
595 600 605	
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His Glu Glu Phe Ala Val Ala Val Lys Leu Met Gln Gly Gly Leu Ile	
610 615 620	
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Asp Val Lys Pro Leu Ile Thr His Thr Leu Pro Leu Ala Asp Ala Leu	
625 630 635	
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Gln Ala Phe Glu Ile Ala Ser Asp Lys Gly Gln Ser Met Lys Thr Gln	
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Ile Ala Phe Ser Met Ser Ile Gln Leu Phe Asp Leu Thr	
655 660 665	
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Gly Lys Arg Ala Leu Val Thr Gly Ser Ser Gln Gly Ile Gly Tyr Ala	
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Leu Ala Lys Gly Leu Ala Ala Ala Gly Ala Asp Ile Val Leu Asn Gly	
685 690 695	
cgc gac gcg gcc aag ctg gcg gcc gcg gcg cag gaa ctc ggc gca aag	2463
Arg Asp Ala Ala Lys Leu Ala Ala Ala Ala Gln Glu Leu Gly Ala Lys	
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cac acg ctc gcc ttc gac gcc acc gac cat gcc gcc gtg cgc gcg gcc	2511

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His Thr Leu Ala Phe Asp Ala Thr Asp His Ala Ala Val Arg Ala Ala	
720 725 730	
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Ile Asp Ala Phe Glu Ala Glu Val Gly Pro Ile Asp Ile Leu Val Asn	
735 740 745	
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Asn Ala Gly Met Gln His Arg Thr Pro Leu Glu Asp Phe Pro Ala Asp	
750 755 760	
gcc ttc gag cgc atc ctg aag acc aac atc tcg acg gtc ttc aat gtc	2655
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765 770 775	
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Gly Gln Ala Val Ala Arg His Met Ile Ala Arg Gly Ala Gly Lys Ile	
780 785 790 795	
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Ile Asn Ile Ala Ser Val Gln Thr Ala Leu Ala Arg Pro Gly Ile Ala	
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ccc tat acc gcc acc aag ggc gcc gtc ggc aac ctc acc aag ggc atg	2799
Pro Tyr Thr Ala Thr Lys Gly Ala Val Gly Asn Leu Thr Lys Gly Met	
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Ala Thr Asp Trp Ala Lys Tyr Gly Leu Gln Cys Asn Ala Ile Ala Pro	
830 835 840	
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Gly Tyr Phe Asp Thr Pro Leu Asn Ala Ala Leu Val Ala Asp Pro Ala	
845 850 855	
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Phe Ser Ala Trp Leu Glu Lys Arg Thr Pro Ala Gly Arg Trp Gly Lys	
860 865 870 875	
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Val Glu Glu Leu Ile Gly Ala Cys Ile Phe Leu Ser Ser Asp Ala Ser	
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Ser Phe Val Asn Gly His Thr Leu Tyr Val Asp Gly Gly Ile Thr Ala	
895 900 905	
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Ser Leu	
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Pro	Asp	Val	Leu	Thr	Lys	Asp	Val	Ala	Asp	Leu	Gly	Ile	Ala	Met	Met
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Gly	Pro	Lys	Asp	Phe	Ala	Arg	Asp	Trp	Thr	Phe	Val	Ala	Asp	Pro	Ala
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	195						200					205			
Ala	Glu	Thr	Arg	His	Ile	Val	Gly	Arg	Lys	Val	Ile	Glu	Ala	Leu	Gly
	210					215					220				
Pro	Glu	Gly	Met	Leu	Ile	Asn	Ile	Ser	Arg	Ala	Ser	Asn	Ile	Asp	Glu
225					230					235				240	
Ser	Ala	Leu	Leu	Asp	Ala	Leu	Glu	Thr	Lys	Ala	Leu	Gly	Ser	Ala	Ala
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<400> 22

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28

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